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Does a waiting time for elective coronary angioplasty affect the primary success rate?

Karel T Koch, Jan J Piek, George K David, Karla Mulder, Ron J G Peters, Kong I Lie

Abstract

Objective—To evaluate the effect of the waiting time for elective percutaneous transluminal coronary angioplasty (PTCA) on the primary success rate.

Setting—University hospital in The Netherlands.

Patients—A cohort of 817 consecutive patients awaiting elective PTCA. Scheduled PTCA was performed in all 817 patients, involving 1237 coronary lesions.

Main outcome measures—The relation between procedural success and the duration of the waiting time was evaluated. Major cardiac events, that is, death and myocardial infarction while awaiting PTCA, were documented. Alterations in lesion characteristics during the waiting time were assessed in unsuccessful procedures.

Results—Elective PTCA was performed within one to six weeks after acceptance in 388 patients (587 lesions; 47.5%), between six and 12 weeks in 203 patients (308 lesions; 25%), and after more than 12 weeks in 226 patients (342 lesions; 27.5%). The procedural success rates in the defined time intervals were 97%, 99%, and 97% in ACC/AHA type A lesions, 93%, 87% and 90% in type B lesions, and 63%, 55% and 38% in type C lesions respectively; 96% of type C lesions were total coronary occlusions. There was a significant decrease in primary success rate in type C lesions after a waiting time beyond 12 weeks. A reasonable explanation for an unsuccessful angioplasty related to alterations in lesion characteristics during the waiting time was documented in only four of 115 procedures.

Conclusions—The primary success in type A and B lesions is unaffected by the duration of a waiting period for elective PTCA. A waiting time of more than 12 weeks is associated with a lower success rate in patients with total coronary occlusions.

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Keywords: angioplasty; waiting time; patient selection; coronary artery disease

In health care systems that operate under limited budgets, financial restrictions may lead to waiting times for resource intensive cardiovascular procedures. There is a tendency to use waiting times as criteria for evaluating and criticising national health care systems. There are limited data available on the consequences of waiting times, and their effects on the quality of medical care.

At our centre, the discrepancy between the number of referred patients and the facilities for performing percutaneous transluminal coronary angioplasty (PTCA) has resulted in waiting times for angioplasty frequently exceeding more than three months in the past years. The purpose of this study was to evaluate the effect of the waiting time for elective PTCA on the primary success rate of the procedure.

Methods

The study group consisted of 817 consecutive patients entered on our waiting list registry after acceptance for elective PTCA between January 1990 and January 1992. During this period we were confronted with increasing waiting times for PTCA. Angioplasty was performed in all 817 patients, involving a total of 1237 coronary lesions. According to the unmodified ACC/AHA criteria, 405 coronary lesions (32%) were classified as type A, 631 (51%) as type B, and 201 (17%) as type C (figure). This classification was based on the angiogram performed before the procedure. Procedural success was defined as less than 50% residual stenosis without major cardiac events, that is, death, coronary artery bypass grafting operation, acute myocardial infarction, or repeat angioplasty within 24 hours. Myocardial infarction was defined as a creatine kinase MB rise of more than twice the upper limit of normal.

The waiting time was defined as the time period from the day the patient was accepted for angioplasty until the day of the procedure itself. The diagnostic angiogram was performed within one week of acceptance for PTCA in 97-8% of patients. In the remaining 2-2% of the patients, the diagnostic angiogram was performed within six weeks of final acceptance. Patients with unstable angina and patients in whom acceptance for angioplasty was not based on a recent coronary angiogram were excluded.

A lesion was considered totally occluded when there was an interruption of the continuity in the angiographic appearance of a coronary artery without antegrade flow. The duration of an occlusion was determined from angiographic data or estimated from an index clinical event such as a myocardial infarct or a
marked change in anginal pattern. The selection of patients and their priority on the waiting list was left to the discretion of the attending interventional cardiologists and depended upon varying criteria, such as functional class of angina, progression of symptoms, or the results of non-invasive testing.

OUTCOME MEASURES

The relation was assessed between procedural success and the duration of the waiting time. The waiting time was divided arbitrarily in three time intervals, that is, less than six weeks, six to 12 weeks and more than 12 weeks, as these time periods were considered relevant for patient management.\(^1\)\(^1\)\(^2\) The incidence of death and myocardial infarction on the waiting list was verified at time the patients were scheduled for the actual procedure. The angiograms of 115 unsuccessfully treated lesions were compared with the initial angiogram in order to evaluate alterations in lesion characteristics during the waiting time that could have been responsible for failure of the procedure.

STATISTICS

Continuous variables were expressed as mean (SD). A \(\chi^2\) test was used to compare dichotomous variables, Student’s \(t\) test for continuous variables; a \(P\) value less than 0·05 was considered significant.

Results

The demographic data of the patients are summarised in table 1. The clinical information on the study patients was complete at the time of the actual procedure. All patients accepted for PTCA were actually scheduled for the procedure, and underwent angioplasty. During the waiting time (mean 8·8 weeks, range 1 to 42), there were no deaths and no patients experienced an acute myocardial infarction.

The overall procedural success rate in the 817 patients was 87·9\% (718 patients). Procedural complications included mortality in one patient (0·1\%), coronary bypass surgery performed in five patients (0·6\%), and acute myocardial infarction found in 20 patients.
Many studies have indicated that the duration of the coronary occlusion is a key factor for success of angioplasty, although others could not demonstrate such a relation. After a...
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accept for angioplasty, and the attending cardiologist at the time the patient was awaited for angioplasty, and the attending cardiologist in charge of the patient while the patient was awaiting PTCA. We did not evaluate these clinical decisions. This certainly may have introduced clinical bias, which nevertheless reflects common clinical practice.

In this study, we used the ACC/AHA lesion morphology classification system, which is subject to criticism for many reasons, especially when used for the estimation of procedural success and risks. We considered it appropriate for the purpose of our study, since it was the only generally applied classification system by the time our data were collected.

It is difficult to estimate the duration of coronary occlusion on the basis of clinical information. This drawback in the methodology applies to all three patient categories, suggesting that the observed differences in the result of PTCA in the three patient groups are related to differences in waiting time. However, we cannot exclude the possibility that differences between the patient groups were already present at the time of acceptance.

The results of this single centre experience warrant confirmation by other investigators. The present study is an observational study: randomisation of waiting times may yield a more definitive answer regarding the effects of waiting times on procedural success.

The angiographic alterations in lesion morphology were only studied in unsuccessful procedures; thus the study yields no general information on progression of coronary artery disease during waiting times.

CONCLUSION

The primary success rate in type A and B lesions is unaffected by the duration of a waiting period for elective coronary angioplasty; a waiting time of more than 12 weeks is associated with a lower success rate in type C lesions. Alterations in lesion morphology that adversely affect procedural outcome are rare during the waiting time. The results of angioplasty in type C lesions may be improved by prioritisation based on angiography, irrespective of the clinical presentation.

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9 Ryan TJ, Faxon DP, Gunnar RP, and the ACC/AHA Task


